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AGREEMENT REGARDING
INTERMEDIATE CAPACITY
TRANSIT SYSTEM
1980

2 OF 2

4.10.4 Alignment Characteristics

(a) Estimate the patronage to be expected for each alignment, and analyze its sensitivity to station location and number and the organization of the feeder bus system.

(b) Establish the measures that would be required in order to achieve the physical, environmental, and operational implementation and integration of each alignment.

4.11 Alignment Analysis and Evaluation

4.11.1 Task Purpose

(a) To analyze the alignments resulting from the process described in Section 4.10.2 in order to shortlist the most promising alignments.

(b) To undertake a detailed relative evaluation of the shortlisted alignments and communicate the important advantages and disadvantages of each alignment or the short list to the Technical Committee.

4.11.2 Preliminary Analysis and Evaluation

(a) Prepare preliminary estimates of the capabilities of each alternative alignment in each of the categories included in the evaluation criteria.

(b) Assemble the inputs received from the public concerning each alternative alignment.

(c) Evaluate each of the alternative alignments against the evaluation criteria identified in Section 4.8.2(d) using the methods established as a result of the review described in Section 4.8.3(c).

(d) On the basis of this evaluation, recommend a shortlist of alignments (up to six) for further study, and prepare the necessary documentation required by the Technical and Steering Committees.

4.11.3 Detailed Analysis and Evaluation

(a) Prepare conceptual designs for each of the shortlisted alignments.

(b) Prepare functional plans for critical locations on each alignment in sufficient detail to assess specific geometric, environmental, or other conditions.

(c) Assemble inputs received from the public concerning the shortlisted alignments.

(d) Evaluate each of the shortlisted alignments against the full evaluation criteria and method developed in Section 4.8.

4.11.4 Evaluation Documentation

(a) Document the analysis and evaluation of the shortlisted alignments in a form suitable for use by the Technical Committee, the Steering Committee, the Regional Council, the public participation program, and the Ministry of the Environment.

(b) Present a summary of the advantages and disadvantages of each alignment to the Technical Committee.

(c) Provide a recommendation to the Technical Committee as to the UTDC preferred alignment, along with a statement of the assumptions made in respect of, nd the reasons for, such preference.

4.12 Preliminary System Description

4.12.1 Task Purpose

(a) To prepare a functional plan that can be used as the basis for future detailed design for the approved alignment.

(b) To prepare a preliminary system specification of the Hamilton-Wentworth Rapid Transit System on the approved alignment.

4.12.2 Functional Plan

(a) Prepare a functional plan for the entire length of the approved alignment.

(b) Prepare functional plans for the stations, yards, maintenance buildings and other system facilities.

4.12.3 Preliminary System Specification

(a) Prepare a preliminary ICTS specification that defines the ICTS configuration and technical attributes necessary to meet the system requirements resulting from Section 4.6.2.

(b) Prepare a preliminary reliability plan establishing subsystem requirements and projected availability and dependability targets.

(c) Prepare a preliminary maintenance plan to establish projected maintenance man-hour allocations for subsystems.

(d) Prepare a preliminary safety plan to set guidelines for design and operation.

(e) Prepare a preliminary human factors plan to ensure that the needs of passengers, the general public and operating and maintenance personnel are met in terms of comfort, convenience, and ease of use.

(f) Prepare a preliminary subsystem noise emission control plan to establish criteria and subsystem allocations which achieve low levels of noise emission.

4.12.4 System Operations Concept

Based upon the operating policies and strategies for the Hamilton-Wentworth Rapid Transit System, to be defined by the Region for use in the evaluation of alternatives:

(a) Prepare a preliminary manual describing normal system operations (system start-up and shut-down, insertion and removal of trains, transfers to storage and maintenance facilities).

(b) Prepare a preliminary failure management plan that describes degraded modes of operation in response to

equipment failure or climatic conditions, and recovery procedures.

(c) Define the preliminary maintenance concept for maintenance and repair of vehicles and wayside equipment.

(d) Develop a preliminary security plan for ensuring protection of passengers, staff and equipment.

4.12.5 Urban Integration

(a) For the approved alignment prepare, to a level of detail suitable for use as the basis for detailed design, a description of the integration of the system with the Region's urban environment, focussing on

- structural integration of stations and guideway with existing and proposed building and urban spaces
- property requirements
- changes to total transportation flow
- infrastructure aesthetics

- interchanges with other transit modes
- interfaces with expected changed transportation flow
- social impact
- land use strategies for the transit corridor

4.12.6 Environmental Integration

(a) Prepare a description of the techniques to be used to integrate the system with the natural environment, especially across the escarpment.

(b) Identify measures for possible incorporation into the system design to minimize any potential noise or visual impacts identified along the approved alignment.

4.12.7 Operating Cost Analysis

(a) Prepare a preliminary estimate of operating and maintenance cost differences between alignments for use in the alignment evaluation process.

(b) For the approved alignment, develop a preliminary estimate of the system operating and maintenance cost.

(c) Assess the impact of the Hamilton-Wentworth Rapid Transit System operation cost on future Hamilton Street Railway capital and operating costs.

4.12.8 Preliminary Implementation Plan

(a) Analyze the relative construction times, costs and risks associated with each alternative alignment.

(b) For the approved alignment, identify the tasks required for the final design, construction, test and commissioning of the system.

(c) Characterize these tasks according to the necessary background skills, experience, facilities and data and information.

(d) Prepare charts and networks to show the duration of the tasks and their inter-dependencies.

4.12.9 Capital Cost Estimate

(a) Prepare preliminary cost estimates for each of the alternative alignments.

(b) For the approved alignment, prepare cost estimates for the implementation activities through to the commencement of revenue services.

## 5.0 DELIVERABLES

The following sections summarize the Data, which is currently envisaged as deliverable to the Region. With respect to packaging, Data may be provided in the form of a specific report, titled substantially as below, or as part of a combined report, as appropriate.

### 5.1 Program Management

- Contract master schedule
- Project budget
- Monthly progress reports including financial reports

### 5.2 Data Collection

- Catalogue of relevant data

5.3 Definition of Alternatives

- Documentation of alignment and station location alternatives

5.4 System Requirements

- System requirements document
- Preliminary Design Standards Manual

5.5 Comparison of Alternative Modes

- Report assessing ICTS as to its suitability for Hamilton application

5.6 Evaluation of Alignment Alternatives

- Methodology for evaluation of alternatives
- Short list of alignments and summary of advantages and disadvantages of each

5.7 Design of Infrastructure

- Conceptual designs of alternative alignments
- Guidelines for specification and final design

5.8 Preliminary System Descripton

- Preliminary System Specification
- Preliminary Design Description, including supportive illustrative material
- Operations Concept
- Preliminary Implementation Cost Estimate

- Preliminary Operating Cost Analysis
- A summary report of the above material

5.9 Top Level Implementation Plan

- Preliminary work program for implementation of the ICTS system in Hamilton

5.10 Environmental Assessment

- Draft application for planning approval under the Environmental Assessment Act of Ontario

5.11 Public Participation Program

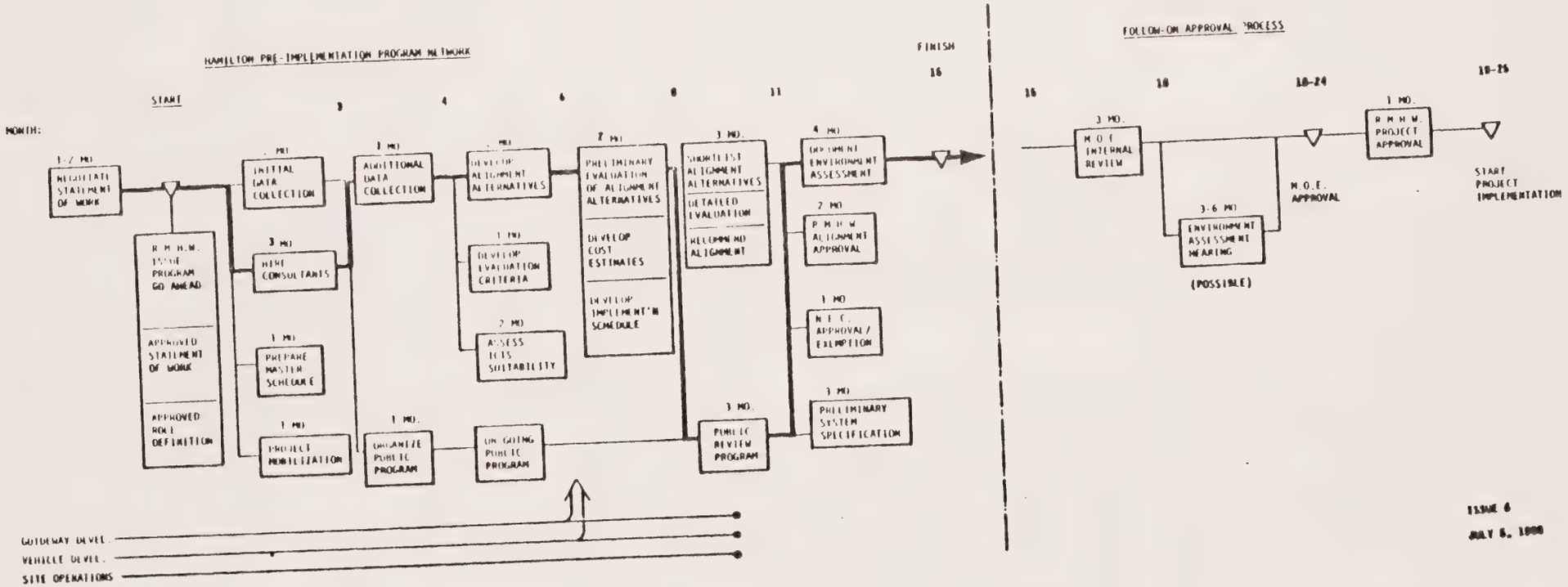
- Final Summary Report

## 6.0 PRELIMINARY SCHEDULE

The preliminary schedule for the Hamilton-Wentworth Pre-implementation Program is attached. This preliminary schedule will be refined and modified as part of task 4.1, above.

## 7.0 RESPONSIBILITY MATRIX

The group bearing the primary and, where applicable, secondary responsibility for the execution of each of the tasks 4.1 through 4.12 is indicated in the matrix attached as Attachment 2. UTDC as Prime Consultant will manage the performance of all of the Work. Reference to UTDC in the matrix includes both UTDC and its Technical Team.


HAMILTON PRE-IMPLEMENTATION PROGRAM NETWORK
START
FINISH
16
MONTH:
3
4
6
8
11
1-2 MO.
NEGOTIATE STATEMENT OF WORK
R.M.H.W. ISSUE PROGRAM GO AHEAD
APPROVED STATEMENT OF WORK
APPROVED ROLE DEFINITION
1 MO.
INITIAL DATA COLLECTION
3 MO.
HIRE CONSULTANTS
1 MO.
PREPARE MASTER SCHEDULE
1 MO.
PROJECT MOBILIZATION
1 MO.
ADDITIONAL DATA COLLECTION
1 MO.
ORGANIZE PUBLIC PROGRAM
1 MO.
DEVELOP ALIGNMENT ALTERNATIVES
1 MO.
DEVELOP EVALUATION CRITERIA
2 MO.
ASSESS ICTS SUITABILITY
ON GOING PUBLIC PROGRAM
2 MO.
PRELIMINARY EVALUATION OF ALIGNMENT ALTERNATIVES
DEVELOP COST ESTIMATES
DEVELOP IMPLEMENT'N SCHEDULE
3 MO.
SHORTLIST ALIGNMENT ALTERNATIVES
DETAILED EVALUATION
RECOMMEND ALIGNMENT
3 MO.
PUBLIC REVIEW PROGRAM
4 MO.
DOCUMENT ENVIRONMENT ASSESSMENT
2 MO.
R.M.H.W. ALIGNMENT APPROVAL
1 MO.
N.E.C. APPROVAL / EXEMPTION
3 MO.
PRELIMINARY SYSTEM SPECIFICATION
GUIDEWAY DEVEL.
VEHICLE DEVEL.
SITE OPERATIONS
FOLLOW-ON APPROVAL PROCESS
15
18
18-24
18-25
3 MO.
M.O.E. INTERNAL REVIEW
3-6 MO.
ENVIRONMENT ASSESSMENT HEARING
(POSSIBLE)
M.O.E. APPROVAL
1 MO.
R.M.H.W. PROJECT APPROVAL
START PROJECT IMPLEMENTATION
ISSUE 6
JULY 6, 1990

Attachment 2 to Schedule A - Statement of Work

RESPONSIBILITY MATRIX

| | Task | Primary Responsibility | Secondary Responsibility |
|---|---|---|---|
| 4.1 | Project Management | UTDC | - |
| 4.2 | Data Collection | UTDC | Consultants |
| 4.3 | Rapid Transit Rationale | Consultants to UTDC | UTDC |
| 4.4 | Environmental Assessment | Consultants to UTDC | UTDC |
| 4.5 | Public Participation Program | Consultants to UTDC | UTDC |
| 4.6 | Operational Requirement | UTDC | - |
| 4.7 | Preliminary Design Standards | UTDC | Consultants to UTDC |
| 4.8 | Evaluation Criteria | Consultants to UTDC | UTDC |
| 4.9 | Comparison of Alternative Modes | Consultants to UTDC | UTDC |
| 4.10 | Alternative Alignment Identification | Consultants to UTDC | UTDC |
| 4.11 | Alignment Analysis and Evaluation | Consultants to UTDC | UTDC |
| 4.12 | Preliminary System Description | UTDC | Consultants to UTDC |

SCHEDULE B

HAMILTON PRE-IMPLEMENTATION PROGRAM PRELIMINARY COST ESTIMATE ($ x 000) FOR THE WORK

| Task No. | Task Description | Preliminary Cost Estimate |
|---|---|---|
| 4.1 | Program Management | 721.6 |
| 4.2 | Data Collection | 69.9 |
| 4.3 | Rapid Transit Rationale | 52.4 |
| 4.4 | Environmental Assessment | 197.9 |
| 4.5 | Public Participation | 183.5 |
| 4.6 | Operational Requirement | 82.7 |
| 4.7 | Preliminary Design Standard | 75.2 |
| 4.8 | Evaluation Criteria | 37.8 |
| 4.9 | Comparison of Alternative Modes | 51.4 |
| 4.10 | Alternative Alignment Identification | 190.0 |
| 4.11 | Alignment Analysis and Evaluation | 579.8 |
| 4.12 | Preliminary System Description | 766.0 |
| | TOTAL | 3,008.2 |
| | Other Direct Charges | 122.0 |
| | TOTAL COST | 3,130.2 |
| | 7-½% Profit | 234.8 |
| | | 3,365.0 |

NOTE: The above estimates are based on a program duration as in Attachment 1 to Schedule A, and assume analysis of 12 feasible alternative alignments and 4 shortlisted alignments and a concrete guideway structure only.

SCHEDULE C

TO AGREEMENT FOR A HAMILTON ICTS PRE-IMPLEMENTATION PROGRAM

BETWEEN THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

AND URBAN TRANSPORTATION DEVELOPMENT CORPORATION LTD.

DATED THE DAY OF JULY, 1980.

INTERIM FINANCING AGREEMENT, DATED JULY, 1980
BETWEEN HER MAJESTY THE QUEEN IN RIGHT OF THE
PROVINCE OF ONTARIO, AS REPRESENTED BY THE
MINISTER OF TRANSPORTATION AND COMMUNICATIONS,
AND THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

AGREEMENT DATED THIS DAY OF JULY, 1980

BETWEEN: HER MAJESTY THE QUEEN, in right of the Province of Ontario, as represented by the Minister of Transportation and Communications,

hereinafter referred to as the "Minister"

OF THE FIRST PART

- and -

THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH, a body corporate established by the Regional Municipality of Hamilton-Wentworth Act of 1973,

hereinafter referred to as the "Region"

OF THE SECOND PART

WHEREAS the Province of Ontario intends to support a revenue service demonstration of the Intermediate Capacity Transit System (ICTS) developed by the Urban Transportation Development Corporation Ltd. (UTDC) and the Region has expressed a desire to have a rapid transit system placed into operation in the City of Hamilton;

AND WHEREAS to that end the Parties and the Government of Canada have reached agreements in principle with respect to the financing of the Hamilton ICTS Revenue Demonstration Project which agreements provide, among other things, for the Government of Ontario to undertake to complete such Project, and to pay such cost relative thereto, including approved cost overruns as are not paid by the Region and the Government of Canada;

AND WHEREAS the Minister recognizes that a certain amount of time will be necessary to execute and put into place the contracts between, as applicable, the Parties, the Government of Canada, and UTDC, arising out of the agreements referred to above, and further recognizes that time is of the essence with respect to the Hamilton ICTS Revenue Demonstration Project;

AND WHEREAS the Government of Canada considers it highly desirable for the Canadian Urban Transit Industry to develop an overall capability to plan, design, construct and commission urban transit technology in Canada, and/or abroad, and to this end the Minister deems it expedient that UTDC undertake the responsibility for the overall co-ordination and management of the ICTS Revenue Demonstration Project in Hamilton;

AND WHEREAS the Region has defined a Pre-implementation Program consisting of certain tasks and studies which must be undertaken prior to the design and construction of a rapid transit system, and intends to enter into an agreement with UTDC with respect to UTDC undertaking the management of such Pre-implementation Program under the direction of the Region's Steering and Technical Committees, and performing certain of the tasks related thereto, which agreement appended hereto as Attachment I is intended to be the first stage of the Hamilton ICTS Revenue Demonstration Project;

AND WHEREAS the Region may enter into agreements with specialist consultants under the guidance of the Region's Steering and Technical Committees for performing certain of the tasks related to said Pre-implementation Program;

AND WHEREAS the Minister concurs with these intents of the Region and agrees to contribute funding to the equivalent of 75% of the total cost of the Pre-implementation Program in accordance with the provision of Section 20(2) of The Public Transportation and Highway Improvement Act and deems that having regard to the nature of the project the costs to be incurred and the needs of the Region, the remaining 25% of total costs will be represented by the staff salaries, wages and employees benefits incurred by the Region with the exception of the salary, staff and payroll cost associated with the Project Co-ordinator who shall be hired by the Region. Reasonable incidental costs such as mileage and other out of pocket expenses incurred by the Region will be paid by the Ministry.

NOW THEREFORE, in consideration of the premises and the terms and conditions herein contained, the Parties hereto covenant and agree as follows:

1. The Minister agrees to provide to the Region funding not to exceed the amount of $3,500,000.00 for the Region's purpose in carrying out the Pre-implementation Program, such funding to be provided to the Region in the form of progress payments to be made against invoices submitted by the Region for costs incurred, in accordance with Article VIII.

II. The Region agrees to conduct the Pre-implementation Program as outlined in and in accordance with the agreement between the Region and UTDC dated July, 1980, appended hereto as Attachment I and forming a part hereof.

III. The Minister shall not make any payment to the Region that in the opinion of the Minister is not an integral part of the program and such decision of the Minister shall be final and binding.

IV. The Region shall provide the Minister promptly with copies of the monthly progress reports.

The Minister shall have the right to be provided with or have access to copies of any and all other reports, data and information provided to the Region with respect to the Pre-implementation Program.

Rights in and title to all data arising directly out of the Pre-implementation Program shall rest in the Region.

V. The Region shall retain all records and data collected or produced in the course of the Pre-implementation Program for a period of five years from the date of completion of the Pre-implementation Program and make same available to the Minister upon request.

VI. The Minister shall require the Region, who in turn shall also require its contracted parties, to keep a detailed record of the hours worked by staff in the execution of the Pre-implementation Program and that the Minister may inspect and audit the books, payroll accounts and records of the Region and of its contracted parties at any time with respect to any item to which the Minister is required to contribute.

VII. The Minister shall advance the sum of $400,000.00 to the Region within 15 days of the execution of this agreement as a pre-financing fund which shall be expended by the Region for defraying costs properly chargeable to the Minister in advance

of receiving payment from the Minister against invoices submitted by consultants. It is expressly agreed that the pre-financing fund will be repayable by the Region to the Minister as credits on the final invoice submitted to the Minister for costs properly incurred as stated in this agreement. The pre-financing fund is for the sole purpose of discharging obligations properly incurred on behalf of the Minister in terms of this agreement in order to avoid late payment charges on accounts due and the sum advanced is not additional to the funding authorized in Article I hereof. At the discretion of the Minister the amount of the pre-financing fund may be reduced to correspond with the average of the actual monthly expenditures incurred by the Region.

VIII. The Region shall submit monthly invoices with supporting data to the Minister. Such invoices shall contain a statement as to costs incurred by or invoiced to the Region. The Minister shall make prompt payment in full of such invoices on receipt thereof.

IX. That the Region warrants that it has done all acts and obtained all approvals that are necessary to authorize the Region to enter into their agreement.

IN WITNESS WHEREOF the Minister of Transportation and Communication for the Province of Ontario on behalf of the Party of the first part, has hereto subscribed his signature and the Party of the second part has hereto by signature of its proper officials duly authorized in that behalf.

EXECUTED AT , AS OF THE DAY OF JULY, 1980.

MINISTER OF TRANSPORTATION AND COMMUNICATIONS

THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
By:

REGIONAL CHAIRMAN

REGIONAL CLERK

REGIONAL COMMISSIONER OF FINANCE

SCHEDULE D

TO AGREEMENT FOR A HAMILTON ICTS PRE-IMPLEMENTATION PROGRAM

BETWEEN THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

AND URBAN TRANSPORTATION DEVELOPMENT CORPORATION LTD.

DATED THE DAY OF JULY, 1980.

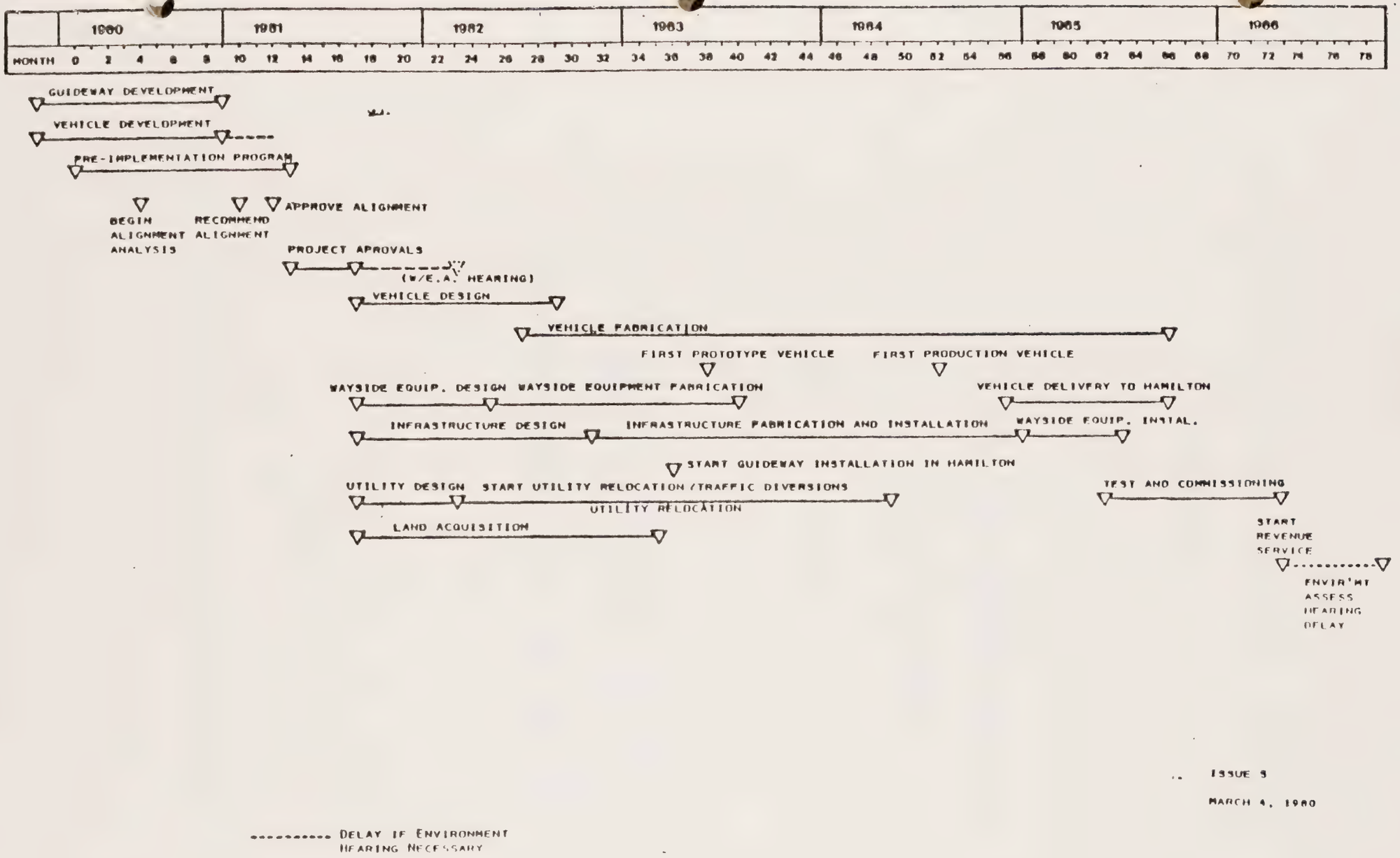
HAMILTON REVENUE DEMONSTRATION

PROJECT SCHEDULE

ISSUE 5, DATED MARCH 4, 1980

HAMILTON REVENUE DEMONSTRATION PROJECT SCHEDULE

SCHEDULE F




ISSUE 5

MARCH 4, 1980

---------- DELAY IF ENVIRONMENT HEARING NECESSARY

SCHEDULE E

TO AGREEMENT FOR A HAMILTON ICTS PRE-IMPLEMENTATION PROGRAM

BETWEEN THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

AND URBAN TRANSPORTATION DEVELOPMENT CORPORATION LTD.

DATED THE DAY OF JULY, 1980.

UTDC APPLICATION TO THE GOVERNMENT OF CANADA
FOR INDUSTRIAL TECHNOLOGY DEVELOPMENT FINANCIAL
ASSISTANCE, VOLUMES 1 AND 2, DATED JUNE 25, 1979.

# icts

intermediate capacity transit system

transportation research &
development industrial
opportunities

1

Urban Transportation Development Corporation Ltd.

# An Application to the Government of Canada

## For Funding Assistance to Advance Industrial Development and Technology R&D in the Urban Transit Industry in Canada

Urban Transportation Development Corporation Ltd.

APPLICATION TO THE GOVERNMENT OF CANADA
FOR FUNDING ASSISTANCE TO ADVANCE
INDUSTRIAL DEVELOPMENT AND TECHNOLOGY
R & D IN THE URBAN TRANSIT INDUSTRY
IN CANADA

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ADDRESSED TO: The Honourable L. Alexander
The Honourable R. Atkey
The Honourable J. Crosbie
The Honourable R. DeCotret
The Honourable R. Hnatyshyn
The Honourable R. Huntington
The Honourable F. MacDonald
The Honourable D. Mazankowski
The Honourable M. Wilson

Revised 25/06/79

## INTRODUCTION

The following is an application for Federal Government financial assistance (to match that committed by the Ontario Government) to complete a major industrial/technology development program in the urban transit equipment sectors that will:

- o create a major export/industrial program with substantial job creation potential
- o significantly increase Research and Development in urban transportation technology in Canada
- o implement major elements of the new Federal Government's Urban Transportation Policy
- o implement many of the recommendations of the First Ministers' Industrial Sector Reports - "Urban Transit Industry Task Force Report"

The proposed financial assistance is a "one-time limited contribution" that:

- o will have a maximum financial exposure to the Federal Government of approximately $33 million over four years and will assist in creating an estimated 3,000 man years of skilled jobs
- o will involve approximately 30 private sector companies
- o has the potential of creating for over $100M in industrial exports per year
- o will limit the financial commitments of the Federal Government in the field of urban transportation

The Urban Transportation Development Corporation Ltd. (UTDC) has developed a prototype Intermediate Capacity Transit System (ICTS) at its Transit Development Centre near Kingston, Ontario. The ICTS is an essential element in the spectrum of modes required by transit operators, and now represents a technology in which Canada has the potential to achieve world leadership in applications and exports. The following pages describe the system, its development, and its relationship to the Canadian domestic transit supply industry and the export market.

UTDC is approaching the conclusion of this major technology development phase of its ICTS program (see Appendix), and must now transform these technological developments and skills into a productionized Canadian industrial capability. To support this process, and in recognition of the new Federal Government's policy in support of urban transit research and development, UTDC is hereby applying for Industrial Technology Development Assistance in the amount of $32,577,000 as partial funding for transit technology demonstration systems. The Government of Ontario has agreed to provide the balance of the necessary funding on an equal share basis. The purpose, distribution and industrial impact of this funding are described in this application.

The first Intermediate Capacity Transit System is proposed for the Regional Municipality of Hamilton-Wentworth as a "Revenue Demonstration Project". The current status of this proposal is as follows:

- it has been endorsed and agreed to by the Ontario Government in December 1978

- in October 1978 the Hamilton-Wentworth Regional Transit Commission and the Regional and Local Councils in Hamilton endorsed the proposed program and requested both the Federal and Provincial Governments to proceed with the project in Hamilton.

## THE CANADIAN URBAN TRANSIT INDUSTRY

The Canadian urban transit equipment industry has become a world leader in the supply of transit equipment and systems. As described in the 1978 Department of Industry Trade and Commerce (DITC) discussion paper The Urban Transportation Equipment Industry in Canada, the development of the industry has occurred largely in the last decade, and has been based on:

- domestic and foreign market opportunities
- provincial initiatives
- expressed federal interest.

Research and development during this period, oriented both to full systems and to sub-systems and components, have provided Canada a dominant position in transit systems development and a world lead in many product areas. The recent industry history is that most of the successful international transit component programs have evolved as a part of a larger system development activity. It is now becoming clear that advances in both components and in full systems in future years will be, for the most part, derived from major systems development programs.

In its report, DITC finds that "the potential for further development of the Canadian urban transportation systems and equipment capability is excellent ... but (the industry's commercial) success is dependent upon its ability to penetrate the domestic market and thus demonstrate its systems capability in revenue service. The importance of a systems capability and the demonstration of that capability in the domestic market cannot be over-emphasized. Without it the companies now forming the Canadian industry sector must inevitably reduce their activity to exploitation of domestic market opportunities under foreign licence. With it, the Canadian share of the world market can continue to increase." It is essential that domestic governments, Provincial and Federal, as the only customers for transit equipment and as the primary benefactors of transit technology advances, provide the research facilities, demonstration capability, and financial climate necessary for the transit industry to achieve this full technical and industrial potential.

## FUNDING PROPOSAL

### Demonstration System Purpose

UTDC has now developed the ICTS technologies to the point where passenger-carrying demonstrations of the system are required. This proposal seeks partial funding for such a demonstration program.

The demonstration system would serve four purposes:

- demonstration of a technology and operational capacity to a world marketplace
- the advancement of prototype designs and tooling and the development and refinement of production designs and provision of production tooling and facilities
- the development of an advanced competitive industrial team in Canada's private sector capable of exporting transit systems to all countries of the world
- the establishment of operational testing and manufacturing competence for revenue service

The prototype vehicles and system hardware developed to date have been single-vehicle fabrications with adjustments and modifications made during component and system testing as required. Two important elements of a system demonstration program are the development of production drawings and the manufacture of tooling suitable for use in an industrial fabrication program. These are the essential elements in the evolution of the ICTS program from a research and technical development effort to an efficient industrial manufacturing and commercial activity undertaken by a coordinated industrial team.

Transit operators, as municipal government agencies, are unable to finance the risks associated with technology development, and therefore usually purchase only existing hardware with a known performance history. Thus, as the final stage in the technical and industrial development, the state-of-the-art ICTS transit technologies must be tested in

continuous operation on a system scale, while subject to the variety of climatic, operational performance, and maintenance conditions experienced in actual transit operation. This can only be done with a passenger-carrying, fully operational system of sufficient size and patronage to provide a realistic transit representation.

The demonstration system would provide a showcase for Canadian transit technology and industrial capability. Revenue demonstration systems in major Canadian cities will form the primary market tools for an export marketing program, and will present concrete illustrations of Canadian industrial and technological capabilities.

The demonstration system would complete the development of a competitive Canadian industrial team. UTDC's proposed industrial team that would lead system marketing and delivery activities is shown in Table 1.

The proposed demonstration systems would serve all of these purposes. It is relevant to note that world competition comes from integrated government/private sector programs in countries such as Germany, Britain, France, and Japan, where governments sponsor programs such as proposed here.

## The Marketplace

The marketplace for ICTS throughout the world is estimated at $6,000,000,000: enclosed with this application as an example of one current and immediate market opportunity is a proposal for a $170,000,000 downtown system in Kuwait now being discussed with Kuwait authorities. In addition, the United States Department of Transportation has embarked on the first $350,000,000 phase of a $2,000,000,000 funding program for installation of identical Downtown People Mover (DPM) systems. The first stage of this program is to begin in 1980 and pre-qualification of world-wide competitors will take place during 1979. Acceptance of this funding proposal would almost ensure Canada's qualification as a competitor.

## Demonstration Location

UTDC has undertaken as an integral part of its ICTS technology development program, a series of applications studies. The purpose of these studies was to test the ICTS system capabilities against the real-life operational requirements of transit system scenarios developed on the basis of Canadian municipalities' assessments of their future transportation needs and plans. The findings of the applications studies were used as a continuous check on the ICTS technology design to ensure that technical definition always conformed to real market needs and opportunities.

The studies revealed that the ICTS system was appropriate in a number of applications. In particular, in Ontario the studies proved that ICTS was especially suited to the requirements of applications in Hamilton's Mountain Corridor and along Toronto's Waterfront. Other applications in Ontario and other provinces were studied and are also known to be suitable, and UTDC welcomes the opportunity to explore any suggested route in any Canadian city.

It is now proposed that the first application will be placed in Hamilton. (See Appendix)

## Ontario Government Support

On September 29, 1978, the Honourable James Snow, Ontario Minister of Transportation and Communications, announced that the Government of Ontario was prepared to provide funding for the Toronto and Hamilton lines as ICTS demonstration systems on the basis of 45%/45%/10% federal/provincial/municipal or private funding, provided the municipalities desired the facilities and would participate in the planning and operation of demonstration systems.

In order to develop the industrial capacity and to create the delivery competence required in this industry for both domestic and export sales of the ICTS, this proposal is an application for a portion of the funding to be provided from the Federal Government's Industrial Technology Development Assistance programs.

## Funding Distribution

The total cost of the proposed demonstration system is estimated to be on the order of approximately $70M, depending on local soil conditions, utility systems, and design requirements. Of this total, more than one half is required for guideway, stations and other civil works construction. However, the funding sought under this application would be used strictly to further the development of the engineering and production skills and industrial capabilties and facilities necessary for implementation of the demonstration systems. Table 2 provides a detailed list of the required expenditures which would be covered by the $32,577,000 requested here. These development tasks represent slightly less than one-half of the total implementation program, accounting for 1,200 man-years of employment in Canada over approximately 5 years.

## Cash Flow

Table 3 indicates the distribution of the requested funding over the next five fiscal years, assuming a Fourth Quarter 1979 program start.

TABLE 3: DEMONSTRATION SYSTEM DEVELOPMENT FUNDING

| FISCAL YEAR | FUNDING ($ x 000*) |
|---|---|
| 1979 - 1980 | 901 |
| 1980 - 1981 | 1,803 |
| 1981 - 1982 | 2,053 |
| 1982 - 1983 | 4,459 |
| 1983 - 1984 | 14,348 |
| 1984 - 1985 | 9,013 |
| TOTAL: | 32,577 |

* MID-1978$

## INDUSTRIAL TEAM

An important component of the demonstration phase of the ICTS development program is the creation of a Canadian industrial team possessing all of the skills and expertise required to produce high technology transit systems for the domestic and international markets. UTDC's objective is to involve as many Canadian suppliers and sub-contractors as possible, in order to maximize industrial participation in the program and to develop a strong and internationally competitive industrial base. UTDC's record during the past four year shows that approximately 95% of all its expenditures have been sub-contracted, and that hundreds of firms across Canada have participated commercially in UTDC programs. Table 1 illustrates the industrial team concept, showing the areas of responsibility and geographical location of various members of a potential demonstration system team. It is estimated that such a team would provide in excess of 3,000 man-years of employment, including engineering, manufacturing, and construction, during the implementation of the initial system valued at approximately $70M.

## TRANSIT DEVELOPMENT CENTRE

In September 1978, the Government of Ontario opened the Transit Development Centre on 480 acres 22 kilometres west of Kingston Ontario. The purpose of this Centre is to provide a nucleus of test facilities for transit technology development in Ontario and in Canada. The Centre is the only comprehensive facility in North America for the development and testing of transit systems and their major components. In addition to serving its own programs, UTDC also plans to make these facilities available to governments, manufacturers and operators at the national and international level.

The Centre provides a base of operation for more than 200 engineers and support staff. It is equipped with a 2500-metre track which is being used to test UTDC's advanced technology Intermediate Capacity Transit System now completing development. Laboratories, engineering and administrative offices plus maintenance facilities are located adjacent to this track.

Depending on the availability of financing, construction will start on a 4800-metre test track for use in the testing of UTDC's four-axle CLRV and its six-axle articulated light rail vehicle. Plans are also being formulated to add an environmental test chamber and a full-size wheel/rail interaction simulator. These plans are all contingent upon suitable funding being available from senior Canadian governments.

The centre's facilities permit both static and running tests of propulsion, suspension, automated train control plus switching and other operations. In addition, the laboratories and computing centre can be used for design and development work for new equipment or systems.

UTDC is developing 180 acres of the Transit Development Centre into a transit related industrial park where member companies can locate their required production and/or development facilities in order to benefit from the corporation's test tracks and other facilities.

When completed, the Transit Development Centre, its adjacent industrial park, and the proximity of Queen's University and other prominent educational institutions, will provide a high technology transit

industry development centre supporting transit product improvement for manufacturers, management and maintenance training programs for transit operators, and prototype technology development programs for governments. The Transit Development Centre will be the focus of the demonstration system engineering and design activities.

## TRANSIT TECHNOLOGY EXPORT AND CURRENT WORLD MARKETS

In its report of September 1978, the DITC Urban Transportation Equipment Industry Consultative Task Force reported that "The Committee is convinced that the world market for urban transportation systems, system infrastructure and equipment provides a significant opportunity for industrial growth in Canada, with consequential benefit to balance of payment and employment levels and to the satisfaction of Canadian urban needs. Canadian companies responding to domestic and foreign market requirements have in recent years increased their commitment to the urban transportation area, working together to develop, manufacture and market a widening range of products. ..... The Committee considers that the policies, plans and activites of governments at all levels are and will continue to be the major and determining factor in the development of the industry sector."

The export market for Intermediate Capacity Transit Systems and their derivatives is developing world-wide. The United States has embarked on the $350,000,000 first phase of its Downtown People Mover program. UTDC's ICTS is expected to qualify as a candidate system on this program this summer, in advance of the procurement process, and UTDC is the Canadian correspondent for the Canada-USA Joint Program in automated guideway transit technology signed on February 28, 1978. UTDC, with the support of DITC, has had serious discussions with transportation officials in Kuwait concerning a potential systems implementation, and cities in Europe and South America have met with UTDC to discuss the application of ICTS to satisfy their transit requirements. A report describing the Kuwait requirement and system is attached.

As indicated earlier, a revenue demonstration of the ICTS is essential if Canada hopes to achieve success in the international marketplace.

# icts

## intermediate capacity transit system

## system description

2

Urban Transportation Development Corporation Ltd.

icts

CONTENTS:


- HAMILTON MOUNTAIN RAPID TRANSIT LINE
- SYSTEM OVERVIEW
- PROGRAM DESCRIPTION
- TORONTO WATERFRONT RAPID TRANSIT LINE (AN ALTERNATIVE APPLICATION)

# icts
## hamilton mountain
### rapid transit line

Urban Transportation Development Corporation Ltd.

# THE HAMILTON OPPORTUNITY

THE NIAGARA ESCARPMENT DIVIDES HAMILTON INTO 2 DISTINCT AREAS. A RELATIVELY NARROW STRIP ALONG THE SHORES OF LAKE ONTARIO CONTAINS HAMILTON'S MAJOR INDUSTRIAL ACTIVITY, THE OLDER RESIDENTIAL AREA AND THE DOWNTOWN CORE. ON TOP OF THE ESCARPMENT, AN EXTENSIVE AREA OF GENTLY ROLLING TOPOGRAPHY FEATURES PRIMARILY RESIDENTIAL DEVELOPMENT ALTHOUGH SOME MAJOR SHOPPING CENTRES AND STRIP COMMERCIAL ACTIVITY EXIST. DEVELOPMENT OF ADDITIONAL RETAIL AND INDUSTRIAL ACTIVITIES AS WELL AS CONSOLIDATION AND EXPANSION OF RESIDENTIAL AREAS WILL CREATE AN EFFECTIVE REGIONAL SUB-CENTRE ON THE MOUNTAIN. THE EXISTING DOWNTOWN CORE IS DESIGNATED AS THE MAJOR REGIONAL CENTRE.

HISTORICALLY, HAMILTON'S DOWNTOWN COMMERCIAL DEVELOPMENT HAS PROCEEDED IN A MANNER COMMON TO MOST OTHER MEDIUM-SIZED CITIES, WITH COMMERCIAL ACTIVITY LINING MAJOR ARTERIAL ROADS AND FOCUSSING ON MAJOR INTERSECTIONS. THE FORM AND PATTERN OF RECENT DEVELOPMENTS, HOWEVER, HAVE CHANGED. THIS IS CHARACTERIZED BY NEW HIGH-RISE HOTELS AND OFFICES AND BY JACKSON SQUARE, A MASSIVE COMPLEX THAT INCORPORATES RETAIL, OFFICE AND COMMERCIAL DEVELOPMENT AND A VARIETY OF CULTURAL AND INSTITUTIONAL ACTIVITIES, SUCH AS HAMILTON PLACE, AN ART GALLERY AND HAMILTON CITY HALL. EVOLVING PLANNING POLICIES WILL REINFORCE THE VITALITY OF THE DOWNTOWN DISTRICT AND ENCOURAGE SUBSTANTIAL GROWTH AND EMPLOYMENT OPPORTUNITIES IN THE CORE AREA. IN THE YEAR 2000, PEAK HOUR TRANSIT VOLUMES WILL BE APPROXIMATELY 10,000 PERSONS PER DIRECTION IN THIS CORRIDOR. THE IMPROVED ACCESSIBILITY OFFERED BY A HIGH QUALITY TRANSIT FACILITY FOR THIS CORRIDOR, WITH THE RESULTANT POTENTIAL INCREASE IN COMMERCIAL LAND VALUES, INDICATES AN ATTRACTIVE OPPORTUNITY FOR TRANSIT TO BE IMPLEMENTED AS A CATALYST FOR FUTURE URBAN DEVELOPMENT LAND GROWTH IN THE AREA.

# THE HAMILTON MOUNTAIN RAPID TRANSIT LINE CONCEPT

THE HAMILTON MOUNTAIN RAPID TRANSIT LINE IS A HIGH QUALITY, ELEVATED TRANSIT SYSTEM LINKING A DEVELOPING REGIONAL SUB-CENTRE ON THE MOUNTAIN WITH THE DOWNTOWN CORE AREA. THE TRANSIT LINE IS SITUATED WITHIN HAMILTON'S MOST HEAVILY UTILIZED TRANSIT CORRIDOR AND WILL PROVIDE VASTLY IMPROVED ACCESSIBILITY FOR,

- RESIDENTIAL AND COMMERCIAL ACTIVITIES ON THE MOUNTAIN
- MOHAWK COLLEGE
- JACKSON SQUARE
- HAMILTON PLACE
- HAMILTON CITY HALL
- OTHER CORE AREA RETAIL, OFFICE AND INSTITUTIONAL ACTIVITIES

THE HAMILTON MOUNTAIN TRANSIT LINE IS THE REVENUE SERVICE PROTOTYPE DEMONSTRATION OF AN ADVANCED-TECHNOLOGY URBAN TRANSPORTATION SYSTEM AND, AS SUCH, IS THE DOMESTIC SHOWCASE FOR CANADIAN INDUSTRIAL CAPABILITIES IN URBAN TRANSIT. THE INNOVATIVE PROPULSION, SUSPENSION, CONTROL AND SUB-SYSTEM INTEGRATION APPROACHES NOW UNDER TEST REPRESENT A TECHNOLOGY FIELD IN WHICH CANADA HAS ACHIEVED WORLD LEADERSHIP. THE HAMILTON MOUNTAIN TRANSIT LINE IS A KEY TO INCREASING CANADIAN VISIBILITY AND PARTICIPATION IN THE RAPIDLY GROWING WORLD MARKET FOR URBAN TRANSIT SYSTEMS AND SUBSYSTEMS.

THE HAMILTON MOUNTAIN TRANSIT LINE REPRESENTS AN OPPORTUNITY TO DEMONSTRATE THE POTENTIAL FOR HIGH QUALITY TRANSIT FACILITIES TO ENCOURAGE, STRUCTURE AND INTEGRATE FUTURE URBAN DEVELOPMENT WITHIN THE FRAMEWORK OF RECOGNIZED PUBLIC GOALS AND OBJECTIVES.

# THE HAMILTON MOUNTAIN RAPID TRANSIT SYSTEM

THE HAMILTON MOUNTAIN RAPID TRANSIT LINE IS A STEEL WHEEL/STEEL RAIL TRANSIT FACILITY OPERATING WITHIN A TOTALLY EXCLUSIVE RIGHT-OF-WAY ALONG AN ELEVATED GUIDEWAY. VEHICLES OPERATE SINGLY OR IN TRAINS AND CAN ACHIEVE A CAPACITY OF 12,000 PASSENGERS PER HOUR PER DIRECTION. AUTOMATIC TRAIN CONTROL ENABLES SHORT HEADWAYS TO BE ATTAINED AND PERMITS UNMANNED OPERATION. AS A RESULT, THE HAMILTON MOUNTAIN TRANSIT LINE IS CHARACTERIZED BY OPERATIONAL FLEXIBILITY AND HIGH QUALITY SERVICE SINCE SERVICE STRATEGY CAN BE TAILORED PRECISELY TO THE SPECIFIC NEEDS AND REQUIREMENTS OF EACH URBAN ACTIVITY CENTRE.

THE SPECIFIC ALIGNMENT AND FINAL DESIGN FOR THE HAMILTON MOUNTAIN TRANSIT LINE WILL BE ESTABLISHED BY THE PARTICIPATING FUNDING GROUPS, AND MUST SATISFY THE FOLLOWING CRITERIA:

- OPTIMIZE CAPITAL AND OPERATING COST SUBJECT TO SERVICE CONSTRAINTS
- MEET AESTHETIC COMPATIBILITY REQUIREMENTS
- PRESERVE INTEGRITY OF SYSTEM OPERATIONS AND QUALITY SERVICE
- PROVIDE SUPPORT FOR THE OBJECTIVES OF THE PUBLIC AND PRIVATE SECTOR PARTICIPATING GROUPS
- DEMONSTRATE POTENTIAL FOR IMPLEMENTATION AS A DEVELOPMENT CATALYST.

SEVERAL ROUTE CONFIGURATIONS MEET THESE GENERAL CRITERIA AND VARIOUS ALIGNMENT ALTERNATIVES ARE POSSIBLE WITHIN EACH ROUTE, DEPENDING ON THE PRIORITY ATTACHED TO THE INDIVIDUAL CRITERIA. A HAMILTON MOUNTAIN SYSTEM WOULD BE APPROXIMATELY 4 KILOMETRES LONG AND WOULD CARRY APPROXIMATELY 10,000,000 PASSENGERS DURING ITS FIRST FULL YEAR OF SERVICE. TOTAL SYSTEM CAPITAL COST, INCLUDING CONTINGENCIES, WOULD BE APPROXIMATELY $70,000,000, AND ANNUAL OPERATING COST WILL BE APPROXIMATELY $2,000,000.

# HAMILTON MOUNTAIN TRANSIT LINE IMPLEMENTATION

CANADA HAS ACHIEVED A POSITION OF WORLD LEADERSHIP IN URBAN TRANSPORTATION TECHNOLOGY. AS A RESULT OF PUBLICALLY-SUPPORTED RESEARCH AND DEVELOPMENT ACTIVITY, THE TECHNICAL SYSTEMS TO BE USED FOR THE HAMILTON MOUNTAIN TRANSIT LINE ARE THE MOST ADVANCED IN THE WORLD. TO MAINTAIN THIS LEADERSHIP POSITION, THE SYSTEMS MUST BE PROVEN UNDER ACTUAL OPERATING CONDITIONS.

TRANSIT VEHICLES AND SYSTEMS HAVE BECOME MORE COMPLEX AND SOPHISTICATED UNDER THE PRESSURE OF INCREASINGLY ONEROUS URBAN CONSTRAINTS. TRANSIT OPERATING AUTHORITIES WORLD-WIDE HAVE RESPONDED BY INSISTING ON PROTOTYPE PROVING PROGRAMS, SUCH AS THE HAMILTON LINE, PRIOR TO THE PURCHASE OF NEW EQUIPMENT. THESE PROGRAMS NORMALLY ARE ASSISTED BY GOVERNMENT AGENCIES AS DEMONSTRATION PROJECTS DESIGNED TO PROVE NEW SYSTEMS UNDER REVENUE-SERVICE CONDITIONS.

THE HAMILTON MOUNTAIN RAPID TRANSIT LINE WILL OPEN FOR FULL PASSENGER SERVICE APPROXIMATELY 5 YEARS AFTER FINAL APPROVAL FOR CONSTRUCTION IS RECEIVED. THE SYSTEM WILL BE THE FOCUS OF ALL PUBLIC TRANSIT SERVICE TO THE MOUNTAIN COMMUNITIES, AND IN ADDITION WILL PROVIDE CENTRAL BUSINESS DISTRICT CIRCULATION. FURTURE EXTENSION OF THE FACILITY TO THE SOUTH-WEST IS FEASIBLE AND WILL ULTIMATELY BE REQUIRED, AND THE DOWNTOWN LOOP CAN BE USED AS THE OPERATING TERMINAL FOR FUTURE EAST-WEST SERVICES. SPECIAL ATTENTION WILL BE GIVEN TO THE USE OF STEEL GUIDEWAY AND STATION ELEMENTS AS URBAN AMENITIES.

# icts
# system overview

Urban Transportation Development Corporation

## WHAT IS ICTS?

The Intermediate capacity Transit System has been developed to fit the passenger demand spectrum midway between the Heavy Rail Transit subways in use in such cities as London and New York and the Light Rail Transit streetcars in common usage throughout the world.

ICTS is designed to operate efficiently in the passenger range of 10,000 to 25,000 passengers per hour per direction. It features trains of small-to-medium sized vehicles serving riders automatically at intervals of about one minute. Its design emphasizes at-grade or elevated urban integration. Where necessary, it can be effectively deployed underground.

ICTS is the rational answer to an evolving need - a system to fit an urban scene which has, for some time, abandoned corridor transit to the bus and auto and where corridor transit must now be instituted if orderly development is to proceed.

WHY ICTS?

Most metropolitan areas now require transit corridor capacities in the intermediate range. A system is needed which can provide such capacities for approximately half the acquisition cost of a subway. ICTS achieves this by avoiding underground construction wherever possible. This also shortens the construction process and the traffic disruptions associated with subway installation methods.

ICTS, because of its at-grade and elevated emphasis permits effective integration with existing urban development and architecture.

Passengers may tranfer easily between ICTS and surface transit modes. Its low noise and vibration permit the ICTS to be incorporated into existing as well as new buildings.

## WHAT IS ITS APPEARANCE?

The vehicles have simple, clean lines and are available in lengths ranging from 10M to 15M. Size and arrangement are tailored to the user's needs.

A special aluminum welding technique provides a light, strong structure. Interiors are well organized to allow efficient passenger flow. Window area is greater than in subway cars.

The elevated guideways feature long spans with a minimum of support columns. The result is superior design flexibility. The open space between guideway beams together with relatively small size further emphasize the light appearance.

Smaller stations are possible because of short trains operating at short intervals. In addition the ICTS can be easily fitted into a variety of architectural styles. The result is minimum intrusion and maximum aesthetic appeal.

## HOW DOES IT OPERATE?

Essential to the ICTS concept is the ability to operate high performance trains safely and quietly at short intervals. This is achieved by an innovative control system (SELTRAC) in combination with a Linear Induction Motor(LIM) mounted on a steerable bogey or truck.

The LIM does not depend on friction to develop traction and thus can accelerate and decelerate the trains more quickly than conventional electric motors. In addition, the absence of moving parts in the LIM minimizes vehicle maintenance requirements.

The specially designed steerable truck eliminates the squeal noise which has been characteristic of steel wheel on steel rail systems.

The ICTS SELTRAC train control system is also used on the Berlin Subway system and on the Deutche Bundesbahn (German Federal Railways). It provides a low cost, flexible method of short headway control and permits remote changes in train make-up, routing and scheduling.

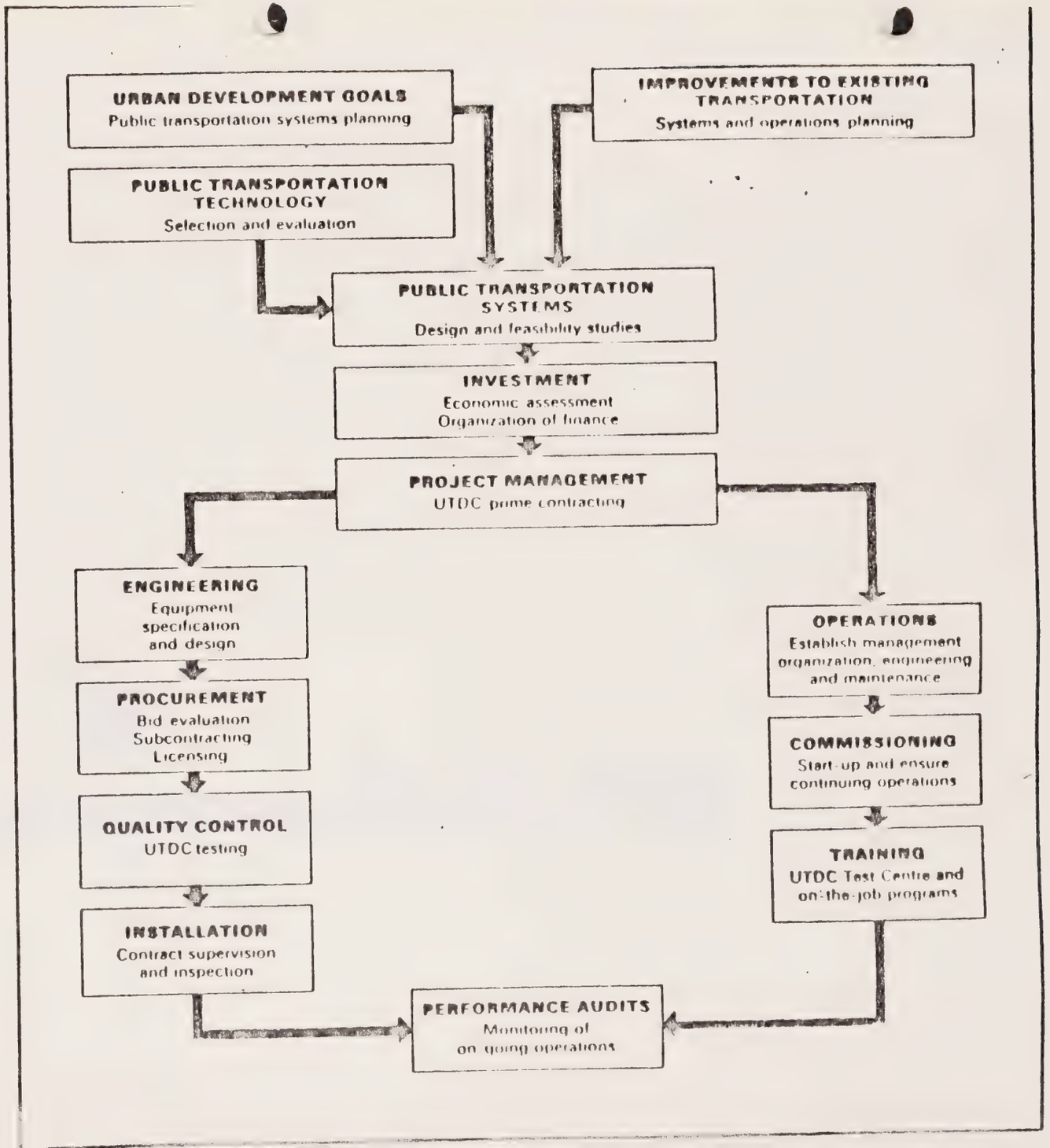
## DOES ICTS REQUIRE SPECIAL SKILLS?

The techniques necessary for guideway and station construction, are adapted from conventional steel and concrete construction practices and require no special production or installation skills.

Carbody manufacture and assembly can be undertaken by any company with aluminum welding capability.

Operating and maintenance staff must include electronics and computer maintenance personnel. However, the equipment employs standardized methods for operation and maintenance.

UTDC CAPABILITIES
IN PUBLIC,.
TRANSPORTATION



# icts
# program description

Urban Transportation Development Corporation Ltd.

## ICTS PROGRAM DESCRIPTION

For many cities which require intermediate capacity transit systems (in the range of 15,000 passengers per hour per direction), there is no practical low cost rapid transit alternative to subways (which are extremely expensive) of greater capacity than buses or streetcars (which add to street congestion). In response to this deficiency, the Province of Ontario in 1975 embarked on a phased Intermediate Capacity Transit System (ICTS) development program. The purpose of this program is to produce a tested, advanced-technology intermediate capacity transit system with substantially lower capital and operating costs than existing systems. The program gives prime consideration to Canadian content and technology.

The ICTS program is divided into five phases:

| | | |
|---|---|---|
| Phase 1 | - | Data Acquisition and Program Definition. |
| Phase 2 | - | Concept Development and Preliminary System Design. |
| Phase 3 | - | Prototype System Development and Testing. |
| Phase 4 | - | Production Development and Testing. |
| Phase 5 | - | Revenue Production. |

At the present time UTDC is in the 29th month of the 40-month third phase at the Transit Development Centre. The major Phase 3 tasks now complete are the development and testing of suspension, propulsion, braking, and command and control sub-systems; the integration of these sub-systems to form a prototype ICTS that meets stringent performance, design, operating and noise emission standard continues. The products of Phase 3 are a tested prototype system and an equipped development and test facility. This phase is on time and on target, and the main test program will be completed in January 1980. Table A.1 illustrates the program schedule, and the enclosed photographs show the development of the ICTS and the Kingston Transit Development Centre.

Phase 3 will carry ICTS to the point where all of the prototype sub-system technologies have been proven and system integration has been successfully accomplished. The purpose of Phase 4 is to transform

prototype hardware into commercial products. The orientation of the program will shift from research and development to productionizing, from prototypical system construction and test to fabrication and check-out of fully equipped revenue-class vehicles and operating system elements. The primary feature of Phase 4 is the transfer of advances in transit system technology state-of-the-art to the Canadian urban transit supply industry, and preparation in the industry to produce revenue service transit systems for both domestic and export markets.

# icts

# toronto waterfront rapid transit line

(AN ALTERNATE APPLICATION)

Urban Transportation Development Corporation Ltd.

# THE TORONTO WATERFRONT OPPORTUNITY

EXHIBITION PLACE IS A TRADITIONAL TORONTO RECREATION FACILITY. THE RECENT AND PROPOSED EXPANSIONS OF THE STADIUM FACILITIES, THE ARRIVAL OF PROFESSIONAL BASEBALL, THE MATURING OF ONTARIO PLACE, AND THE INCREASING NUMBER OF LEISURE-ORIENTED SHOWS AND FAIRS ALL SERVE TO INCREASE CNE ACTIVITY. TO THE EAST ARE THE TORONTO ISLANDS, WHICH CONSTITUTE ONE OF METRO TORONTO'S MOST POPULAR PARKS. THESE MUNICIPAL AND PROVINCIAL RECREATION FACILITIES ARE COMPLEMENTED BY THE FEDERAL GOVERNMENT'S RAPIDLY DEVELOPING HARBOURFRONT PARK THAT OFFERS A VARIETY OF ENTERTAINMENT THROUGHOUT THE YEAR. METROPOLITAN TORONTO HAS DECIDED TO ENCOURAGE THE USE OF ALL OF THESE FACILITIES ON A YEAR-ROUND BASIS. ONE OF THE LIMITS TO HIGHER UTILIZATION IS THE EMPHASIS ON ROAD ACCESS, AND THE LACK OF CONCRETE PLANS FOR IMPROVING TRANSIT ACCESSIBILITY.

IN 1977, OVER 25,000,000 TRIPS ORIGINATED IN OR WERE DESTINED TO THE CNE-UNION STATION CORRIDOR. SEVERAL OF THE MAJOR ATTRACTIONS AND THEIR ATTENDANCE LEVELS WERE:

| | | | |
|---|---|---|---|
| - ONTARIO PLACE ... | 3,100,000 | - C.N.E. ..... | 3,500,000 |
| - CFL FOOTBALL .... | 400,000 | - COLISEUM ..... | 1,300,000 |
| - HARBOURFRONT .... | 300,000 | - ISLAND FERRY .... | 1,100,000 |
| - CN TOWER ..... | 1,300,000 | - AL BASEBALL ..... | 1,700,000 |

TRANSPORTATION TO WATERFRONT ATTRACTIONS PRESENTS SPECIFIC PROBLEMS NOT COMMON TO OTHER URBAN TRANSPORTATION SITUATIONS, AND NOT EASILY ACCOMMODATED BY CONVENTIONAL ROAD-BASED TRANSIT MODES:

- RAILWAY AND EXPRESSWAY BARRIERS THAT ISOLATE THE WATERFRONT
- VERY PEAKED AND ERRATIC PASSENGER FLOW PATTERNS
- IRREGULAR EVENT SCHEDULES AND VARIABLE ATTENDANCE LEVELS
- EXTREME ROADWAY CONGESTION
- HIGH COST OF HIGH-CAPACITY, SHORT-TERM TRANSIT SERVICE
- INSUFFICIENT PEAK PARKING SUPPLY.

SOME SPECIAL SERVICES TO WATERFRONT EVENTS ARE POPULAR AND VIABLE, BUT MOST OPERATE AT A LOSS AND PROVIDE POOR PASSENGER SERVICE.

COMMERCIAL AND RESIDENTIAL DEVELOPMENT IN THE WATERFRONT AREA INCLUDES THE TORONTO STAR BUILDING, THE HARBOUR SQUARE HOTEL, CONVENTION CENTRE, APARTMENT, AND OFFICE COMPLEX, AND SEVERAL SMALLER BUILDINGS. IN ADDITION, SEVERAL LARGE WATERFRONT LAND PARCELS HAVE BEEN OR ARE ABOUT TO BE APPROVED FOR RESIDENTIAL AND COMMERCIAL DEVELOPMENT. MOST NOTABLE IS THE RECENTLY-RELEASED 200-ACRE RAILWAY LANDS SITE, WHERE COMPLETED DEVELOPMENT WILL PROVIDE EMPLOYMENT FOR AT LEAST 20,000 PEOPLE AND HOUSING FOR AT LEAST 5,000 PEOPLE. IN ADDITION TO VACANT LANDS, SEVERAL OTHER PROPERTIES WILL BECOME SUITABLE FOR RE-DEVELOPMENT OR UPGRADING AS A RESULT OF IMPROVED ACCESSIBILITY.

# THE TORONTO WATERFRONT RAPID TRANSIT LINE CONCEPT

THE WATERFRONT LINE IS A HIGH QUALITY ELEVATED TRANSIT SYSTEM LINKING TORONTO'S WEST-CENTRAL LAKESHORE WITH THE DOWNTOWN AREA AND THE YONGE AND UNIVERSITY/ SPADINA SUBWAY LINES. IT PROVIDES A CONNECTION BETWEEN UNION STATION AND,

- EXHIBITION PLACE
- EXHIBITION STADIUM
- ONTARIO PLACE
- HARBOURFRONT PARK
- HARBOUR SQUARE
- ISLANDS FERRY TERMINAL
- RAILWAY LANDS
- CN TOWER

THE WATERFRONT LINE IS THE REVENUE SERVICE PROTOTYPE DEMONSTRATION OF AN ADVANCED-TECHNOLOGY URBAN TRANSPORTATION SYSTEM AND, AS SUCH, IS THE DOMESTIC SHOWCASE FOR CANADIAN INDUSTRIAL CAPABILITIES IN URBAN TRANSIT. THE INNOVATIVE PROPULSION, SUSPENSION, CONTROL AND SUB-SYSTEM INTEGRATION APPROACHES NOW UNDER TEST REPRESENT A TECHNOLOGY FIELD IN WHICH CANADA HAS ACHIEVED WORLD LEADERSHIP. THIS FACILITY IS A KEY TO INCREASING CANADIAN VISIBILITY AND PARTICIPATION IN THE RAPIDLY GROWING WORLD MARKET FOR URBAN TRANSIT SYSTEMS AND SUBSYSTEMS.

THE WATERFRONT LINE IS A UNIQUE OPPORTUNITY FOR PUBLIC AND PRIVATE SECTOR GROUPS TO PARTICIPATE JOINTLY IN A PROJECT THAT PROVIDES A DESIRABLE PUBLIC AMENITY HAVING SIGNIFICANT COMMERCIAL POTENTIAL FOR THE LAND DEVELOPMENT, CONSTRUCTION, ENTERTAINMENT, RECREATION, AND SERVICE INDUSTRIES. IT WILL BE A WELL-UTILIZED PUBLIC ASSET THAT ENABLES THE FEDERAL, PROVINCIAL, AND MUNICIPAL GOVERNMENTS TO PROVIDE AN ESSENTIAL TRANSPORTATION SERVICE IN SUPPORT OF THE DIVERSIFIED PUBLIC ENTERTAINMENT AND RECREATIONAL ACTIVITIES IN TORONTO'S WATERFRONT AREA.

# THE TORONTO WATERFRONT RAPID TRANSIT SYSTEM

THE TORONTO WATERFRONT RAPID TRANSIT LINE IS A STEEL WHEEL/STEEL RAIL TRANSIT SYSTEM OPERATING WITHIN A TOTALLY EXCLUSIVE RIGHT-OF-WAY ALONG AN ELEVATED GUIDEWAY. VEHICLES OPERATE SINGLY OR IN TRAINS AND CAN ACHIEVE A CAPACITY OF 15,000 PASSENGERS PER HOUR PER DIRECTION. AUTOMATIC TRAIN CONTROL ENABLES SHORT HEADWAYS TO BE ATTAINED AND PERMITS UNMANNED OPERATION. AS A RESULT, THE SYSTEM IS CHARACTERIZED BY OPERATIONAL FLEXIBILITY AND HIGH QUALITY SERVICE, SINCE SERVICE STRATEGY CAN BE TAILORED PRECISELY TO THE SPECIFIC NEEDS AND REQUIREMENTS OF EACH WATERFRONT ACTIVITY CENTRE.

THE SPECIFIC ALIGNMENT AND FINAL DESIGN FOR THE LINE WILL BE ESTABLISHED BY THE PARTICIPATING FUNDING GROUPS, AND MUST SATISFY THE FOLLOWING CRITERIA:

- OPTIMIZE CAPTIAL AND OPERATING COST SUBJECT TO SERVICE CONSTRAINTS
- MEET AESTHETIC COMPATIBILITY REQUIREMENTS
- PRESERVE INTEGRITY OF SYSTEM OPERATIONS AND QUALITY SERVICE
- PROVIDE SUPPORT FOR THE OBJECTIVES OF THE PUBLIC AND PRIVATE SECTOR PARTICIPATING GROUPS.

SEVERAL ROUTE CONFIGURATIONS MEET THESE GENERAL CRITERIA AND VARIOUS ALIGNMENT ALTERNATIVES ARE POSSIBLE WITHIN EACH ROUTE, DEPENDING ON THE PRIORITY ATTACHED TO THE INDIVIDUAL CRITERIA. THE SELECTED SYSTEM WILL BE 4 TO 5 KILOMETRES LONG AND WILL CARRY BETWEEN 7,000,000 AND 10,000,000 PASSENGERS DURING ITS FIRST FULL YEAR OF SERVICE. TOTAL SYSTEM CAPITAL COST, INCLUDING CONTINGENCIES, WILL BE APPROXIMATELY $65,000,000, SUBJECT TO THE EXACT ALIGNMENT AND DESIGN SELECTED, AND ANNUAL OPERATING COST WILL BE APPROXIMATELY $2,000,000.

# TORONTO WATERFRONT RAPID TRANSIT IMPLEMENTATION

CANADA HAS ACHIEVED A POSITION OF WORLD LEADERSHIP IN URBAN TRANSPORTATION TECHNOLOGY. AS A RESULT OF PUBLICALLY-SUPPORTED RESEARCH AND DEVELOPMENT ACTIVITY, THE TECHNICAL SYSTEMS TO BE USED FOR THE WATERFRONT LINE ARE THE MOST ADVANCED IN THE WORLD. TO MAINTAIN THIS LEADERSHIP POSITION, THE SYSTEMS MUST BE PROVEN UNDER ACTUAL OPERATING CONDITIONS.

TRANSIT VEHICLES AND SYSTEMS HAVE BECOME MORE COMPLEX AND SOPHISTICATED UNDER THE PRESSURE OF INCREASINGLY ONEROUS URBAN CONSTRAINTS. TRANSIT OPERATING AUTHORITIES WORLD-WIDE HAVE RESPONDED BY INSISTING ON PROTOTYPE PROVING PROGRAMS, SUCH AS THIS FACILITY, PRIOR TO THE PURCHASE OF NEW EQUIPMENT. THESE PROGRAMS NORMALLY ARE ASSISTED BY GOVERNMENT AGENCIES AS DEMONSTRATION PROJECTS DESIGNED TO PROVIDE NEW SYSTEMS UNDER REVENUE-SERVICE CONDITIONS.

THE LINE WILL OPEN FOR FULL PASSENGER SERVICE 54 MONTHS AFTER FINAL CONSTRUCTION APPROVAL IS RECEIVED. THE DESIGN, CONSTRUCTION, AND REVENUE OPERATION OF THE LINE WILL BE ADMINISTERED BY AN AGENCY WHICH RECEIVES CAPITAL AND OPERATING SUPPORT FROM THE PUBLIC AND PRIVATE SECTOR PARTICIPANTS. BECAUSE A SEPARATE FARE WILL BE COLLECTED AND BECAUSE THE WATERFRONT LINE WILL ONLY OPERATE WHEN SERVICE IS REQUIRED, THE OPERATING COSTS WILL BE FULLY RECOVERABLE FROM FAREBOX REVENUE. SURPLUS FAREBOX REVENUE WILL BE AVAILABLE FOR CAPITAL DEBT SERVICING, FOR SYSTEM IMPROVEMENTS, OR FOR FARE REDUCTIONS. RETURNS ON INVESTMENT WILL ALSO BE DERIVED FROM INCREASES IN WATERFRONT UTILIZATION, FROM COMMERCIAL OPPORTUNITIES RELATED TO THE LINE, FROM MORE EFFICIENT USE OF PUBLIC TRANSPORTATION AND ENTERTAINMENT FACILITIES, AND FROM CANADIAN DOMESTIC INDUSTRIAL BENEFITS.

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